

1979

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Primavera, J. H., Young, T., & de los Reyes, C. (1979). Survival, maturation, fecundity and hatching rates of unablated and ablated *Penaeus indicus* H.M. Edwards from brackishwater ponds. SEAFDEC Aquaculture Department Quarterly Research Report, 3(3), 14–17.

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Survival, maturation, fecundity and hatching rates of unablated and ablated *Penaeus indicus* H.M. Edwards from brackishwater ponds*

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Penaeus indicus H.M. Edwards harvested after three months rearing in brackishwater ponds and averaging 6.9 g for females and 5.6 g for males were stocked in two 12 cu m flowthrough ferrocement tanks at 240 females and 200 males per tank. After one week of acclimation, the females in one tank were ablated by pinching either the left or right eyestalk of the prawn between the thumb and forefinger and squeezing the eye contents outwards.

The z-test showed a significantly higher survival after two months at 69% for unablated females compared to 53% for ablated *P. indicus* after two months (Table 1). The higher mortality rates for the ablated group could be due to the added stresses of ablation and spawning (up to a maximum of 7 spawnings for one female). Males in both groups had a higher survival of over 90% compared to both unablated and ablated females. This can be traced to lack of handling and spawning stress as observed elsewhere for *P. monodon* broodstock. In terms of growth, males and females in both groups showed similar trends, (Table 1).

Ablation had a positive effect on maturation in terms of a greater number of spawnings per female and a consequent tenfold increase in total number of spawnings, an eightfold increase in total number of eggs and a sixfold increase in total number of nauplii produced. Ablated females produced a total number of 757 spawnings, 17.5×10^6 eggs and 6.6×10^6 nauplii compared to a total of 74 spawnings, 2.0×10^6 eggs and 1.1×10^6 nauplii from unablated females (Table 2).

* Paper presented at the International Symposium on Coastal Aquaculture, 12-18 January 1980, Cochin, India.

Table 1. Growth and survival of unablated and ablated *Penaeus indicus* in maturation tanks.

	Unablated		Ablated	
	Male	Female	Male	Female
No. stocked	200	242	200	245
No. survivors	186	168	184	131
% survival*	93.0	69.4	92.0	53.5
Ave. C.L. (mm)				
Initial	18	20	18	20
Final	21	24	21	24
Ave. B.W. (g)				
Initial	5.6	6.9	5.6	6.9
Final	9.7	13.2	9.4	12.0
Ave. B.L. (mm)				
Initial	73	78	73	78
Final	85	94	8691	91

* z-test showed significant difference between unablated and ablated females at 5% level.

Table 2. Maturation in unablated and ablated *Penaeus indicus* in maturation tanks.

	Unablated	Ablated
Total no. spawnings (first and subsequent spawnings)	74	757
Total no. eggs produced	1,997,000	17,473,000
Ave. no. eggs/spawning	26,990	23,480
Total no. nauplii produced	1,076,000	6,599,000
Ave. % hatching rate*	53.9	37.8

* z-test showed significant difference between unablated and ablated females at 5% level.

The z-test showed no significant difference in average fecundity of 23,480 eggs/spawning for ablated *P. indicus* and 26,990 eggs/spawning for unablated females. However, average hatching rate of 53.9% was significantly higher for unablated females compared to 37.8% for ablated spawners. With ablated females spawning up to 7 times, the period between successive spawnings (as short as three days) was probably inadequate to complete ovarian development. This could result in poorer egg quality and lower hatching rate.

More than 90% of the ablated females had the first spawning within three weeks after ablation. Rematurations constitute a greater proportion of later spawnings. It is remarkable that practically 100% of ablated females had at least one spawning compared to less than 25% for unablated ones (Tables 3 & 4). Fecundity tends to increase with subsequent spawnings in both unablated and ablated females which may be due to the increase in the size of the females. According to Rao (1968) a female of 140 mm total length can yield 68,000 eggs. The closest figure to this is a fecundity of 95,000 eggs for the third spawnings in the unablated group (Table 3). It may be that as unablated females grow older and larger, the rate of maturation and number of spawnings will increase.

Table 3. Number of spawnings, fecundity and hatching rate in unablated *Penaeus indicus* in maturation tanks over a two-month period.

	Total no. spawnings	Total no. eggs produced	Total no. nauplii produced	Ave. % H.R.	Ave. no. eggs/spawning
1st spawning	57	1,320,000	747,000*	57.6	23,160
2nd spawning	15	487,000	310,000	63.6	32,470
3rd spawning	2	190,000	19,000	10.0	95,000
Total	74	1,997,000	1,076,000	53.8	26,990

* Nauplii from one spawning not counted.

Hatching rate is more or less the same for successive spawnings in ablated females which could be related to both availability and viability of sperm in the thelycum of the female. If an ablated female undergoes another spawning as quickly as three days after the previous one for a total of 3-4 spawnings within one intermolt period, the quality and quantity of sperm may be greatly decreased after the first few spawnings. Only after the next molt could the female mate and get a fresh spermatophore deposition.

LITERATURE CITED

Rao, P.V., 1968. Maturation and spawning of the penaeid prawns of the southwest coast of India. FAO Fish. Rep. 2:285-302.

Table 4. Number of spawnings, fecundity and hatching rate in ablated *Penaeus indicus* in maturation tanks.

	Total no. spawnings	Total no. eggs produced	Total no. nauplii produced	Ave. % H. R.	Ave. no. eggs/spawnin
1st spawning	308	5,871,000*	2,399,000	40.9	19,900
2nd spawning	189	3,914,000	1,304,000	33.3	20,700
3rd spawning	121	3,388,000	1,286,000	38.0	28,000
4th spawning	77	2,042,000	753,000	36.9	26,520
5th spawning	42	1,361,000	634,000	46.6	32,400
6th spawning	17	805,000	216,000	26.8	47,350
7th spawning	3	92,000	7,000	7.6	30,670
Total	757	17,473,000	6,599,000	37.8	23,480

* 13 spawners with no egg counts.